

SEQUENCE LISTING

<110> Sera, Takashi

5 <120> Zinc Finger Domain Recognition Code and Uses Thereof

<130> 109846-130

10 <150> US 60/220,060

<151> 2000-07-21

<160> 69

15 <170> PatentIn version 3.0

<210> 1

<211> 28

<212> PRT

20 <213> Artificial Sequence

<220>

<223> Zinc finger domain.

25 <220>

<221> VARIANT

<222> (1)..(28)

<223> Amino acids 1-3, 8-19 and 25-28 are Xaa wherein Xaa = any amino acid.

30

<220>

<221> VARIANT

<222> (5)..(6)

<223> Amino acid 5 is Xaa wherein Xaa = any amino acid, amino acids 5 and 6 together represent from 2 to 4 amino acids in length.

35

<220>

<221> VARIANT

<222> (21)..(23)

<223> Amino acid 21 is Xaa wherein Xaa = any amino acid, amino acids 21-23 together represent from 3 to 5 amino acids in length.

<400>> 1

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Xaa Xaa Xaa Cys Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa His Xaa Xaa Xaa His Xaa Xaa Xaa Xaa
10 20 25

<210> 2

<211> 28

15

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<213> Artificial Sequence

<220>

<223> Zinc finger domain.

20

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<221> VARIANT

<222> (1)..(28)

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<223> Amino acids 1-3, 8-12, 14, 17-18 and 25-28 are Xaa wherein Xaa = any amino acid.

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<221> VARIANT

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<222> (5)..(6)

<223> Amino acid 5 is Xaa wherein Xaa = any amino acid, amino acids 5 and 6 together represent from 2 to 4 amino acids in length.

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<221> VARIANT

<222> (21)..(23)

<223> Amino acid 21 is Xaa wherein Xaa = any amino acid, amino acids 21-23 together represent from 3 to 5 amino acids in length.

<223> Zinc finger protein.

<400>> 3

5 Val Pro Ile Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly
1 5 10 15
Cys Gly Lys Val Tyr Gly Gln Ser Ser Asp Leu Gln Arg His Leu Arg
20 25 30
10 Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly
35 40 45
Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His
15 50 55 60
Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met
65 70 75 80
20 Arg Ser Asp Glu Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys
85 90 95
Asp Gly Gly Gly Ser Gly Lys Lys Lys Gln His Ile Cys His Ile Gln
100 105 110
25 Gly Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu
115 120 125
Arg Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys
30 130 135 140
Gly Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr
145 150 155 160
35 His Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe
165 170 175
Met Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys
180 185 190

Lys Gly Gly Ser

195

5

<210> 4

<211> 99

<212> PRT

<213> Artificial Sequence

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<220>

<223> Zinc finger protein.

<400> 4

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Val Pro Ile Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly
1 5 10 15

Cys Gly Lys Val Tyr Gly Thr Thr Ser Asn Leu Arg Arg His Leu Arg
20 25 30

Trp His Thr Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly
35 40 45

25

Lys Arg Phe Thr Arg Ser Ser Asn Leu Gln Arg His Lys Arg Thr His
50 55 60

Thr Gly Glu Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met
65 70 75 80

30

Arg Ser Asp His Leu Ser Arg His Ile Lys Thr His Gln Asn Lys Lys
85 90 95

35

Gly Gly Ser

<210> 5

<211> 99
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5 <220>
 <223> Zinc finger protein.

<400> 5

10 Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
 1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu
 20 25 30

15 Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro
 35 40 45

20 Glu Cys Gly Lys Ser Phe Ser Arg Ser Ser His Leu Gln Gln His Gln
 50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
 65 70 75 80

25 Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln
 85 90 95

Asn Lys Lys

30

<210> 6
 <211> 99
 <212> PRT

35 <213> Artificial Sequence

<220>
 <223> Zinc finger protein.

<400> 6

5 Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu
20 25 30

10 Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro
35 40 45

15 Glu Cys Gly Lys Ser Phe Ser Glu Ser Ser Asp Leu Gln Arg His Gln
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
65 70 75 80

20 Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln
85 90 95

Asn Lys Lys

25

<210> 7

<211> 99

<212> PRT

<213> Artificial Sequence

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<220>

<223> Zinc finger protein.

<400> 7

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1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu

099461.02301
105240#T9T550

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	Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys				
	65		70		75 80
5					
	Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln				
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	Asn Lys Lys				
10					
	<210> 9				
	<211> 99				
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	<213> Artificial Sequence				
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	<223> Zinc finger protein.				
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		20		25	30
	Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro				
30		35		40	45
	Glu Cys Gly Lys Ser Phe Ser Arg Ser Ser Asn Leu Gln Glu His Gln				
	50		55		60
35					
	Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys				
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	Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln				
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Asn Lys Lys

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<210> 10

<211> 99

<212> PRT

<213> Artificial Sequence

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<220>

<223> Zinc finger protein.

<400> 10

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1 5 10 15

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His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu
20 25 30

Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro
35 40 45

25

Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asp Leu Gln Arg His Gln
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
65 70 75 80

30

Ser Phe Ser Arg Ser Asp His Leu Ser Arg His Gln Arg Thr His Gln
85 90 95

Asn Lys Lys

35

<210> 11

<211> 229

<212> PRT

<213> Human

<400> 11

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1 5 10 15

Gly Lys Ala Tyr Glu Asn Lys Arg Lys Thr Gly Arg Gln Arg Glu Lys
20 25 30

10 Trp Gly Met Thr Ile Arg Phe Asp Ser Ser Phe Ser Arg Leu Arg Arg
35 40 45

Ser Leu Asp Asp Lys Pro Tyr Lys Cys Thr Glu Cys Glu Lys Ser Phe
15 50 55 60

Ser Gln Ser Ser Thr Leu Phe Gln His Gln Lys Ile His Thr Gly Lys
65 70 75 80

20 Lys Ser His Lys Cys Ala Asp Cys Gly Lys Ser Phe Phe Gln Ser Ser
85 90 95

Asn Leu Ile Gln His Arg Arg Ile His Thr Gly Glu Lys Pro Tyr Lys
25 100 105 110

Cys Asp Glu Cys Gly Glu Ser Phe Lys Gln Ser Ser Asn Leu Ile Gln
115 120 125

30 His Gln Arg Ile His Thr Gly Glu Lys Pro Tyr Gln Cys Asp Glu Cys
130 135 140

Gly Arg Cys Phe Ser Gln Ser Ser His Leu Ile Gln His Gln Arg Thr
145 150 155 160

35 His Thr Gly Glu Lys Pro Tyr Gln Cys Ser Glu Cys Gly Lys Cys Phe
165 170 175

Ser Gln Ser Ser His Leu Arg Gln His Met Lys Val His Lys Glu Glu

	180	185	190
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10	225		
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	<211> 393		
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	<213> Mouse		
	<400> 12		
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	20 25 30		
25	Thr Ala Glu Glu Trp Val Ser Tyr Pro Leu Gln Gln Val Thr Asp Leu		
	35 40 45		
	Leu Val His Lys Glu Ala His Ala Gly Ile Arg Tyr His Ile Cys Ser		
30	50 55 60		
	Gln Cys Gly Lys Ala Phe Ser Gln Ile Ser Asp Leu Asn Arg His Gln		
	65 70 75 80		
35	Lys Thr His Thr Gly Asp Arg Pro Tyr Lys Cys Tyr Glu Cys Gly Lys		
	85 90 95		
	Gly Phe Ser Arg Ser Ser His Leu Ile Gln His Gln Arg Thr His Thr		
	100 105 110		

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	His	Lys	Cys	Thr	Glu	Cys	Ala	Lys	Ala	Ser	Ala	Ala	Ser	Pro	His	Leu	
	145					150					155					160	
10	Ile	Gln	His	Gln	Arg	Thr	His	Ser	Gly	Glu	Lys	Pro	Tyr	Glu	Cys	Glu	
					165					170					175		
	Glu	Cys	Gly	Lys	Ser	Phe	Ser	Arg	Ser	Ser	His	Leu	Ala	Gln	His	Gln	
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	Arg	Thr	His	Thr	Gly	Glu	Lys	Pro	Tyr	Glu	Cys	His	Glu	Cys	Gly	Arg	
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20	Gly	Phe	Ser	Glu	Arg	Ser	Asp	Leu	Ile	Lys	His	Tyr	Arg	Val	His	Thr	
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25	Asn	Ser	Asp	Leu	Val	Arg	His	Arg	Arg	Ala	His	Thr	Gly	Glu	Lys	Pro	
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	Tyr	His	Cys	Asn	Glu	Cys	Gly	Glu	Asn	Phe	Ser	Arg	Ile	Ser	His	Leu	
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	Val	Gln	His	Gln	Arg	Thr	His	Thr	Gly	Glu	Lys	Pro	Tyr	Glu	Cys	Thr	
			275					280					285				
35	Ala	Cys	Gly	Lys	Ser	Phe	Ser	Arg	Ser	Ser	His	Leu	Ile	Thr	His	Gln	
		290					295					300					
	Lys	Ile	His	Thr	Gly	Glu	Lys	Pro	Tyr	Glu	Cys	Asn	Glu	Cys	Trp	Arg	
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Ser Phe Gly Glu Arg Ser Asp Leu Ile Lys His Gln Arg Thr His Thr
325 330 335

5 Gly Glu Lys Pro Tyr Glu Cys Val Gln Cys Gly Lys Gly Phe Thr Gln
340 345 350

Ser Ser Asn Leu Ile Thr His Gln Arg Val His Thr Gly Glu Lys Pro
355 360 365

10 Tyr Glu Cys Thr Glu Cys Asp Lys Ser Phe Ser Arg Ser Ser Ala Leu
370 375 380

15 Ile Lys His Lys Arg Val His Thr Asp
385 390

<210> 13

<211> 28

20 <212> PRT
<213> Artificial Sequence

<220>

25 <223> Zinc finger domain.

<220>

<221> VARIANT

<222> (13)..(13)

30 <223> Amino acid 13 is Xaa wherein Xaa = Z-1 wherein Z-1 = Arg or Lys,
Gln or Asn, Thr, Met, Leu or Ile, or Glu or Asp.

<220>

<221> VARIANT

35 <222> (15)..(15)

<223> Amino acid 15 is Xaa wherein Xaa = Z2 wherein Z2 = Ser or Arg,
Asn or Gln, Thr, Val, or Ala, or Asp or Glu.

<220>

<221> VARIANT

<222> (16)..(16)

<223> Amino acid 16 is Xaa wherein Xaa = Z3 wherein Z3 = His or Lys,
Asn or Gln, Ser, Ala, or Val, or Asp or Glu.

5

<220>

<221> VARIANT

<222> (19)..(19)

<223> Amino acid 19 is Xaa wherein Xaa = Z6 wherein Z6 = Arg or Lys,
Gln or Asn, Thr, Tyr, Leu, Ile or Met, or Glu or Asp.

10

<400> 13

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Xaa Ser Xaa Xaa

1

5

10

15

Leu Gln Xaa His Gln Arg Thr His Thr Gly Glu Lys

20

25

15

20

<210> 14

<211> 10

<212> DNA

<213> Tomato golden mosaic virus

25

<400> 14

agtaaggtag

10

30

<210> 15

<211> 28

<212> PRT

<213> Artificial Sequence

35

<220>

<223> Zinc finger domain.

<400> 15

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Asp Ser
1 5 10 15

Leu Gln Arg His Gln Arg Thr His Thr Gly Glu Lys
5 20 25

<210> 16

<211> 28

<212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger domain.

<400> 16

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Arg Ser Asp Asn
1 5 10 15

Leu Gln Gln His Gln Arg Thr His Thr Gly Glu Lys
20 25

<210> 17

<211> 28

<212> PRT

<213> Artificial Sequence

<220>

<223> Zinc finger domain.

<400> 17

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Thr Ser Thr His
1 5 10 15

Leu Gln Gln His Gln Arg Thr His Thr Gly Glu Lys
20 25

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		tatatatagc gtgggcgtta tatata	26
35			
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	<211>	26	
	<212>	DNA	
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[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]

Abstract

The purpose of this study was to determine whether there were differences in the prevalence of risk factors for coronary artery disease between two groups of men who had been exposed to asbestos during their working lives. The subjects were divided into two groups based on the duration of exposure to asbestos: those who had been exposed for less than 10 years ($n = 67$) and those who had been exposed for 10 or more years ($n = 89$). The subjects were interviewed by telephone about their smoking habits, alcohol consumption, exercise, and family history of heart disease. The results showed that the prevalence of risk factors for coronary artery disease was significantly higher in the group exposed to asbestos for 10 or more years compared to the group exposed for less than 10 years.

[illegible][illegible][illegible][illegible]

Abstract

The purpose of this study was to determine whether there were differences in the prevalence of risk factors for coronary artery disease between two groups of men who had been exposed to asbestos during their working lives. The subjects were divided into two groups based on the duration of exposure to asbestos: those who had worked in asbestos-related occupations for less than 10 years ($n = 167$) and those who had worked in such occupations for 10 or more years ($n = 189$). The subjects were interviewed by telephone about their smoking habits, alcohol consumption, exercise, and other factors related to coronary artery disease. The results showed that the prevalence of risk factors for coronary artery disease was significantly higher in the group with longer exposure to asbestos compared to the group with shorter exposure.

[illegible][illegible][illegible][illegible][illegible][illegible][illegible]

Abstract

The purpose of this study was to determine whether there were differences in the prevalence of risk factors for coronary artery disease between two groups of men who had been exposed to asbestos during their working lives. The subjects were divided into two groups based on the duration of exposure to asbestos: those who had worked in asbestos-related occupations for less than 10 years ($n = 167$) and those who had worked in such occupations for 10 or more years ($n = 189$). The subjects were interviewed by telephone about their smoking habits, alcohol consumption, exercise, and other factors related to coronary artery disease. The results showed that the prevalence of risk factors for coronary artery disease was significantly higher in the group with longer exposure to asbestos compared to the group with shorter exposure.

[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]

<400> 29

tatatataag taagg tacta tatata

26

5

<210> 30

<211> 84

<212> PRT

10 <213> Artificial Sequence

<220>

<223> Zinc finger protein.

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<220>

<221> VARIANT

<222> (15)..(15)

<223> Amino acid 15 is "Xaa" wherein "Xaa" = Asp or Gly.

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<400> 30

Pro Tyr Lys Cys Pro Glu Cys Gly Lys Ser Phe Ser Asp Ser Xaa Ala

1 5 10 15

25

Leu Gln Arg His Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys

20 25 30

Pro Glu Cys Gly Lys Ser Phe Ser Gln Ser Ser Asn Leu Gln Lys His

30

35 40 45

Gln Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly

50 55 60

35

Lys Ser Phe Ser Arg Ser Asp His Leu Gln Arg His Gln Arg Thr His

65 70 75 80

Thr Gly Glu Lys

<213> Artificial Sequence

<220>

5 <223> Zinc finger domain target sequence.

<220>

<221> misc_feature

<222> (15)..(17)

10 <223> Nucleotides 15-17 are "n" wherein "n" = g, a, t, or c.

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tatatatagg ggaannnata tatata

26

15

<210> 34

<211> 26

<212> DNA

<213> Artificial Sequence

20

<220>

<223> Zinc finger domain target sequence.

<220>

25 <221> misc_feature

<222> (15)..(17)

<223> Nucleotides 15-17 are "n" wherein "n" = g, a, t, or c.

<400> 34

30 tatatatagg ggaannntta tatata

26

<210> 35

<211> 26

35 <212> DNA

<213> Artificial Sequence

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<223> Zinc finger domain target sequence.

<223> Nucleotides 37-39 and 46-51 are "n" wherein "n" = g, a, t, or c.

<400> 37

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5

<210> 38

<211> 60

<212> DNA

10 <213> Artificial Sequence

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<223> Partial zinc finger domain oligomer.

15 <220>

<221> misc_feature

<222> (46)..(57)

<223> Nucleotides 46-48 and 52-57 are "n" wherein "n" = g, a, t, or c.

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ggtgaaaaac catacaaatg tccagagtgc ggcaaattct tctctnnntc tnnnnnnctt 60

<210> 39

25 <211> 60

<212> DNA

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<220>

30 <223> Partial zinc finger domain oligomer.

<220>

<221> misc_feature

<222> (37)..(51)

35 <223> Nucleotides 37-39 and 46-51 are "n" wherein "n" = g, a, t, or c.

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 <211> 56
 <212> DNA
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 10 <220>
 <223> Partial zinc finger domain oligomer.

 <220>
 <221> misc_feature
 <222> (48)..(58)
 <223> Nucleotides 48-50 and 54-58 are "n" wherein "n" = g, a, t, or c.
 15
 <400> 40
 ggcgagaagc cttacaagtgc ccctgaatgc gggaagagct ttagtnnnag tnnnnn 56

 20 <210> 41
 <211> 55
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 25 <220>
 <223> Partial zinc finger domain oligomer.

 <220>
 <221> misc_feature
 30 <222> (28)..(48)
 <223> Nucleotides 28-30, 37-42 and 46-48 are "n" wherein "n" = g, a, t,
 or c

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 35 cttctccccc gtgtgcgtgc gttggtgnnn ttgtaannnn nnactnnnac taaag 55

 <210> 42
 <211> 45

<212> DNA
 <213> Artificial Sequence

 <220>
 5 <223> PCR primer.

 <400> 42
 gggcccggtc tcgaattcgg ggagaagccg tataaatgtc cggaa 45

 10
 <210> 43
 <211> 48
 <212> DNA
 <213> Artificial Sequence
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 <220>
 <223> PCR primer.

 <400> 43
 20 cccggggggtc tcaagctttt acttctcccc cgtgtgcgtg cgttggtg 48

 <210> 44
 25 <211> 10
 <212> DNA
 <213> Beet curly top virus

 <400> 44
 30 ttgggtgctc 10

 <210> 45
 <211> 60
 35 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Partial zinc finger domain oligomer.

<400> 45

ggggagaagc cgtataaatg tccggaatgt ggtaaaagtt ttagcaccag cagcgatttg 60

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<210> 46

<211> 60

<212> DNA

<213> Artificial Sequence

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<220>

<223> Partial zinc finger domain oligomer.

<400> 46

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<210> 47

<211> 60

20 <212> DNA

<213> Artificial Sequence

<220>

<223> Partial zinc finger domain oligomer.

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<210> 48

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<212> DNA

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<223> Partial zinc finger domain oligomer.

<400> 48

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 agtaaggtag gagatgata 19

 15 <210> 67
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 <223> ZFP target sequence.
 20
 <400> 67
 tacgtggcat tgggtgctc 19
 25
 <210> 68
 <211> 28
 <212> PRT
 30 <213> Artificial Sequence

 <220>
 <223> Zinc finger domain.

 35 <220>
 <221> VARIANT
 <222> (13)..(13)
 <223> Amino acid 13 is "Xaa" wherein "Xaa" = Z1 wherein Z1 = Arg, Gln,
 Thr, Met or Glu

5 <220>
 <221> VARIANT
 <222> (15)..(15)
 <223> Amino acid 15 is "Xaa" wherein "Xaa" = Z2 wherein Z2 = Ser, Asn, Thr, or Asp
 10 <220>
 <221> VARIANT
 <222> (16)..(16)
 <223> Amino acid 16 is "Xaa" wherein "Xaa" = Z3 wherein Z3 = His, Asn, Ser, or Asp
 15 <220>
 <221> VARIANT
 <222> (19)..(19)
 <223> Amino acid 19 is "Xaa" wherein "Xaa" = Z6 wherein Z6 = Arg, Gln, Thr, Tyr, Leu, or Glu
 20 <400> 68
 Gln His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Xaa Ser Xaa Xaa
 1 5 10 15
 25 Leu Gln Xaa His Gln Arg Thr His Thr Gly Glu Lys
 20 25
 30 <210> 69
 <211> 28
 <212> PRT
 <213> Artificial Sequence
 35 <220>
 <223> Zinc finger domain.
 <220>
 <221> VARIANT
 <222> (13)..(13)

